

Application No. 10/826,148
Amendment Dated May 15, 2006
Reply to Office Action Dated November 11, 2005

Amendments to the Drawings:

The attached sheets includes changes to the Figures 1-3.

Sheet 1 which includes Figures 1 and 3 replaces the original sheet 1 including Figures 1 and 3.

Sheet 2 which includes Figure 2 replaces the original sheet 2 including Figure 2.

In all three figures the drawings were made formal taking to care to eliminate blurred or thinned lines.

Attachment: Replacement Sheet
Annotated Sheet Showing Changes

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Remarks

Claims 5-8 are pending.

Claims 5-8 stand rejected.

Claims 5 and 7 have been amended.

Claims 5-8 are presented herein for further review.

In paragraph 1 of the Office Action, the Examiner has noted that certain references referred to in the specification have not been considered because they were not submitted on a separate form PTO-892. Applicant hereby submits the three references from the Background section in a standard Information Disclosure Statement format. It is noted that "Powering Up Conducting Cable" by Taylor More. Epri Journal, Spring 1999 is submitted in English as well as U.S. Patent No. 4,984,605 which is the U.S. version of EP 0 326 923. No translation is provided for the *Elektrotechnische Zeitung* article as it was discussed only for general background purposes and its relevance is evident from the figure alone.

On a separate note, three new references were referenced in the corresponding European Search Report: DE 197 24 618, GB 1 576 798 and US 3 668 297. All three references are listed as "A" background references, not relevant to the claims. An English abstract is submitted for DE'618, enclosed with the accompanying Information Disclosure Statement.

In paragraph 2 of the Office Action, the Examiner has objected to the drawings. Applicant hereby re-submits the drawings as formal drawings and respectfully requests that the

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objection to the figures be withdrawn.

In paragraph 3 of the Office Action, the Examiner has objected to the specification. Applicant has amended the specification to include the appropriate headers and respectfully requests that the objection to the specification be withdrawn. Applicant notes that paragraph [0010] of the specification has been cancelled as it improperly referred to the claims.

In paragraph 6 of the Office Action, the Examiner has rejected claims 5-8 under 35 U.S.C. § 112. Applicant has amended claim 5 to address the issue of antecedent basis and to place the claim in appropriate method format. Claim 7 has been amended to clarify the scope of the elements.

In paragraph 8 of the Office Action, the Examiner has rejected claims 5-8 under 35 U.S.C. § 103(a) as being obvious over Hirose et al. (U.S. Patent No. 6,718,618). Applicant respectfully disagrees with the Examiner's contentions and submits the following remarks in response.

The present invention as claimed in independent claim 5 is directed to a process for the production of a superconducting cable having a single cable core, which contains at least one elongated superconducting element, and a flexible tube surrounding the cable core.

The process includes continuously pulling the single cable core from a supply unit, continuously pulling a metal strip from a strip supply unit, continuously forming a slotted tube around the cable core with the metal strip to form a slotted tube, welding a longitudinal slot of the slotted tube shut, and corrugating the welded tube with the cable core inside the tube.

The inside diameter of the corrugated tube is larger than the outside diameter of the cable

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core to form a semi-finished superconducting cable, which is wound in at least one turn on a drum, and *where the ends of the cable core are mechanically joined to the ends of the corrugated tube while the cable is on the cable drum or is lying in at least one turn.*

Such an arrangement provides a distinct advantage over prior art systems.

In prior art systems, when superconducting cables are in the operating state and the superconductor and the cable elements surrounding it are at the temperature of the liquid helium or of the liquid nitrogen, they become shorter than the external cable elements, which are at ambient temperature. To prevent this decrease in length, fittings are provided at both ends of the cable to connect the individual cable elements non-positively to each other and thus to prevent the inner cable elements from becoming shorter than the outer cable elements. (See paragraph [0008] of the corresponding publication). The associated increase in tensile stress on the conductor core(s) however leads to a decrease in performance.

The present invention takes advantage of the fact that the conducting cores are less flexible than the corrugated metal tubes formed around the core. Because of the way the cable core is designed, it is much stiffer than the corrugated tube. The cable core therefore lies against the inside surface of the radially outer part of the wall of the corrugated tube; that is, the turns of the cable core try to assume the largest possible diameter. As noted in claim 5, the inside diameter of the corrugated tube is larger than the outside diameter of the cable core, causing the length of the cable core located inside the corrugated tube is greater, relative to the center axis in question, than the length of the corrugated tube. *By connecting the ends of the cable core to the ends of the corrugated tube while the superconducting cable is on the cable drum, there is an*

excess length of the cable core in the corrugated tube. When the superconducting cable is unwound later from the cable drum, either the corrugated tube stretches by an amount which corresponds to this excess, or the cable core comes to rest at intervals against the inside wall of the corrugated tube in a wave-like manner. When the superconducting cable is operating, i.e., when it is at the temperature of liquid nitrogen, the increase in the length of the corrugated tube is reversed or the wavy form of the cable core is lost, but without the resulting tensile stresses present in the prior art. (See paragraph [0011] of the corresponding publication.

The cited prior art does not show such a system. Hirose deals with a similar problem, namely that of shrinking of the cores relative to the outer cable due to the cooling of the core. However, Hirose teaches a multi core cable, where the excess slack of core length is generated by twisting and the addition and subsequent removal of spacers (12) before the metal tube is formed. (See column 3, line 55 – column 4, lines 12).

In order to support the rejection of the element that the ends of the cable core are mechanically joined to the ends of the corrugated tube while the cable is on the cable drum by citing to column 3, lines 63-65. This passage in Hirose recites:

“The thus-corrugated pipe 4 is taken up on a drum 23. The spacers 12 are removed before the stranded cores [are] introduced into the welder 21.”

This passage simply recites that the cable (cores and tube) are taken up onto a drum and that the spacers are removed. However, it does not suggest that the ends of the cores are attached to the ends of the corrugated tube. Such a step is not necessary in Hirose as the aim is to achieve a slack in the cores by other means (twisting and spacers).

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As such, the cited prior art does not teach or suggest the present invention as claimed. For example, there is no teaching in Hirose that discloses or suggests all of the elements of the present invention as claimed. For example, there is no teaching or suggestion in Hirose that discloses mechanically joining the ends of the cable core to the ends of the corrugated tube while the cable is on the cable drum or is lying in at least one turn.

Applicant requests that the rejection of claim 5 in view of Hirose be withdrawn. As claims 6-8 depend from claim 5, the rejection of these claims should be withdrawn as well for at least the reasons set forth above.


In view of the foregoing, Applicant respectfully submits that the pending claims are currently in condition for allowance, the earliest possible notice of which is earnestly solicited. If the Examiner feels that a telephone interview would advance the prosecution of this application they are invited to contact the undersigned at the number listed below.

Respectfully submitted

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Dated: 5/15/06

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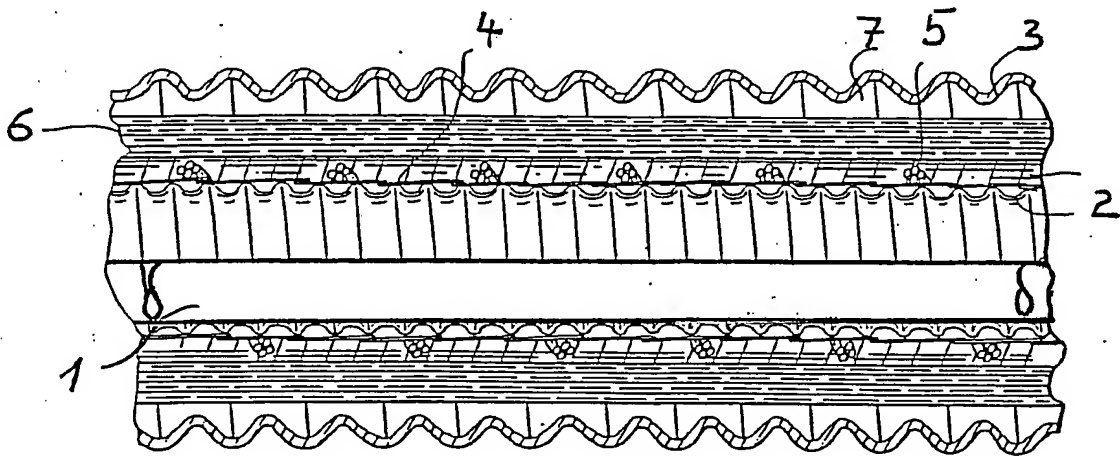


FIG. 1

Made Formal.

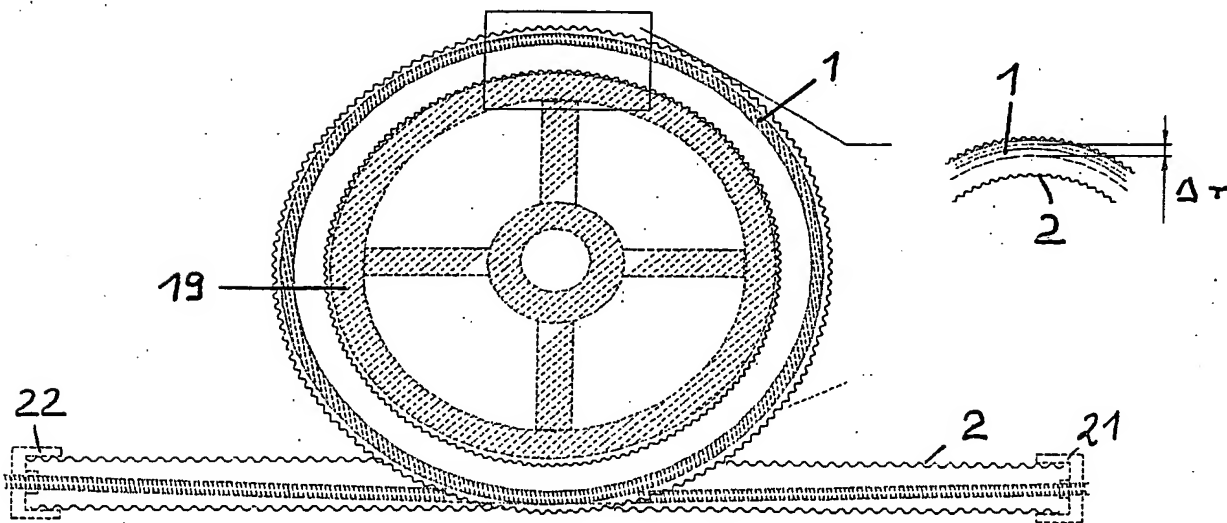


Fig 3

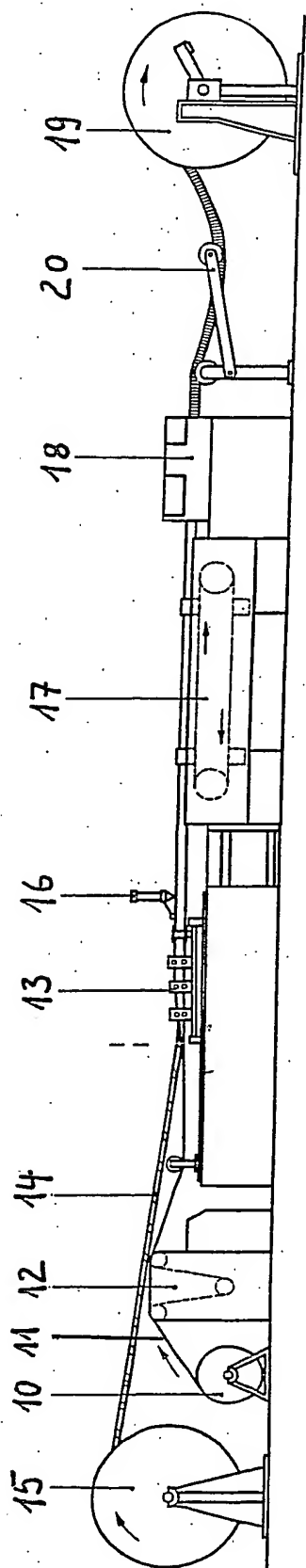


Fig 2

Made
Formal